

**Commercial Demonstration of the Manufactured Aggregate
Processing Technology Utilizing Spray Dryer Ash**

**Quarterly Technical Progress Report
January 1, 2006 through March 31, 2006**

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ABSTRACT

This is the quarterly report under the subject agreement for the period from January 1, 2006 through March 31, 2006. The report summarizes activities for the project for the period in the following categories: personnel, operations, engineering, technical support, marketing support and miscellaneous.

Executive Summary

About 2,300 tons of aggregate were produced from the manufactured aggregate plant during this quarter. Numerous equipment and operational problems continued to limit production and impede plant availability. The management team for the project focused on identifying, evaluating and correcting the problem areas of the plant to improve both plant production and availability.

EXPERIMENTAL

This section is not applicable to this project.

RESULTS AND DISCUSSION

Personnel

Two electricians and three technicians were hired this quarter. One mechanic departed UA to return to an upgraded position with his former employer. This brought the total number of hourly employees at the plant to 19.

Operations Summary

During the month of January, more than 6,000 tons of dry SDA were processed through the plant and approximately 700 tons of cured aggregate were produced. On January 1, a Roots air blower used to transport SDA from Birchwood's ash silo failed. A replacement blower was expedited and installed. Considerable manpower was devoted to cleaning spillage and re-tracking the L410A conveyor belt at the top of the CV. Upon inspection, it was determined that the ventilation ductwork connecting the four cans of the CV to the wet scrubber/blower were nearly plugged and in need of immediate attention. All ductwork was removed, cleaned, and re-installed as necessary. After further evaluation, the ductwork was re-configured to reduce the flow of air/dust from the cans and eliminate plugging in the future. Following the above work, operations to the curing vessel were able to resume on intermittent intervals lasting between 2 and 8 hours. At mid-month, a failed bearing on the lime pulverizer was replaced. Additional downtime was required to service/replace belts on two of the three conveyor belts beneath the CV (L-410B and L410D). At month's end, a 3-day outage was scheduled for major maintenance to the pug mill, pug sealer and extruder. Service technicians from J. C. Steele were on-site to assist with this work.

In February, 5,732 tons of dry SDA were processed through the plant and 965 tons of aggregate were produced. Operations to the curing vessel were completed on intermittent intervals lasting between 2 and 8 hours. With assistance from J. C. Steele technicians, the extruder liners and augers were removed, thoroughly cleaned and re-installed. In addition, the pugmill and pugsealer were cleaned and both sealing core augers were replaced. Plant operations were halted when SDA feed was lost due to a failed bearing on the rotary valve beneath Birchwood's silo. Following a heavy snowstorm, the plant endured an extended power outage (~32 hours). Heavy chunks at the base of the CV impeded operations and led to a belt failure (L410D). At month's end, SDA feed was halted due to a broken gearbox that drives the rotary valve beneath Birchwood's silo.

In March, more than 6,000 tons of dry SDA were processed through the plant and 627 tons of aggregate were produced. One forced outage was scheduled by UA to complete installation of the new dust collector on top of the SDA day bin. At the base of the CV, contractors installed a 6,000 CFM dust collector, ductwork, and applied sheet metal skirting around the inclined conveyor belt (L410F). UA personnel completed the necessary electrical and plumbing work on the two new dust collectors and both are

performing well. Significant time and effort was spent clearing conglomerations in the CV cans and pantlegs. In addition, the CV was recirculated extensively to aid in clearing any build-up and to balance the cans. Water spray nozzles at the pugmill were cleaned and replaced as necessary to improve water distribution. At month's end, the main SDA feeder (K120A) began performing erratically, which limited plant operations. Consequently, an Acrison technician was scheduled for a service visit.

Engineering:

Engineering continued its efforts on the following problem areas of the plant: ash transfer system beneath the Birchwood ash silo, improve operability of the lime pulverizer, the wet scrubber and dust control at the top of the CV, repeated mechanical failures of rotary valves, transfer of pulverized lime to the tumbler, performance of recycle feeder (K250) and refinements to the PLC control logic. Discussions with all relevant vendors and engineering firms regarding these problem areas were ongoing. A guided radar level transmitter was specified, installed, and performing well on the SDA day bin. A 1,800 CFM bin vent dust collector was received and installed to address the excess air problem in the SDA day bin. Installation details and equipment specifications for the CV recirculation feed system were finalized with Imperial Technologies (IT). An Eriez vibratory feeder and an Airotech bin vent were ordered in accordance with IT's design. A 7,000 CFM dust collector was ordered to address dust control areas throughout the main plant. Bids were received/evaluated for a tank mixer to agitate diluted lignosulfonate once it is purchased and stored in the existing bulk additive tank. All drawings were approved and fabrication was begun for the CV recirculation feed system. An eductor/blower system was ordered to convey discharging solids from the new 7,000 CFM dust collector (top floor of main plant).

Engineers from Imperial Technologies were on-site to discuss equipment and design options for distributing product at top of CV (replace rotary chute). Discussions with other engineering firms on this subject are ongoing. Tom Hanwell of RT Patterson was on-site to review all proposed PLC modifications. Performance issues with recycle feeder were observed and corrective actions discussed with manufacturer (Acrison). Engineers supervised installation and start-up of two new dust collectors. Delivery and installation of all equipment associated with the new CV recirculation system was scheduled for April.

Technical Support

The effects of ambient temperature and embedding material quality on curing vessel operation were evaluated during integration runs. Procedures to improve curing vessel operation were recommended. Hydrated lime and carbon contents in spray dryer ash (SDA) were monitored for ash quality in this quarter. The averages of hydrated lime contents were $16.6 \pm 2.3\%$ in January, $16.4 \pm 2.2\%$ in February and 12.8 ± 2.8 in March. The decrease in hydrated lime content in March is related to improvement in spray dryer operation at BPP. The carbon contents in SDA were mostly in the range of 3.9 to 5%. Both are adequate for aggregate production.

Marketing Support

Conduct regular, weekly meetings (on site) with contract aggregate distributor/buyer regarding status of plant start-up and quality control. Continue to assist with plant start-up, process and product testing, admixture evaluation, contingency plans, engineering modifications, product transportation, and promotion to potential consumers/users.

Miscellaneous:

Two elbows on the SDA transport piping were removed, inspected, and replaced. A belt scale was installed at the top of L510A conveyor belt to meter tonnage of incoming product from the CV. Temporary ductwork was installed to relieve excess air in the SDA day bin by intervening to the Recycle day bin. A broken shear pin was replaced on the extruder feed auger. A leaky knife gate valve and a failed rotary valve were replaced beneath Birchwood's SDA silo. The belt scraper on conveyor L310B was relocated and serviced. A failed motor (25 HP) for the wet scrubber blower was replaced. Maintenance was necessary to service the rotary chute and clean the pantlegs at the top of the CV. Time was devoted to troubleshooting malfunctioning radar level instrumentation in the top of the CV cans. The drive belts on the lime pulverizer were serviced and re-tensioned to improve operability. A belt scale was installed on conveyor L310B (extruder discharge). A belt (L510D belt conveyor) and two belt scrapers were replaced. Three additional access ports were added to the top of CV can "C".

DOE

The Quarterly Technical Progress Report was submitted for the fourth quarter of 2005. On March 7, Wolfe Huber (DOE COR) was on-site for a tour of the plant and operations.

CONCLUSION

Extensive problem areas exist throughout the plant. Specific problem areas have been identified. Actions were being directed to correct the problem areas for improvements in both plant production and availability.

REFERENCES

Not applicable for this report.